Consolidated Water Use Efficiency

Proposal Part One:

**A. Project Information Form**

1. Applying for: (a) Prop 13 Urban Water Conservation Captial Outlay Grant

   (b) Prop 13 Agricultural Water Conservation Capital Outlay Feasibility Study Grant

   X **© DWR Water Use Efficiency Project**

2. Principal applicant (Organization or affiliation): **Vandalia Irrigation District**

3. Project Title: **Reservoir Project Surface and Groundwater Utilization**

4. Person authorized to sign and Submit proposal: **Steve Drumright**

5. Contact Person: **Steve Drumright**
   **Vandalia Irrigation District**
   **2032 South Hillcrest**
   **Porterville, CA 93257**
   **Phone: (559) 784-0121**

6. Funds requested: **$377,000**

7. Applicant funds pledged: **$ 97,000**

8. Total project costs: **$474,000**

9. Estimated total quantifiable project benefits: **A projected $45,000 cost benefit in Energy related savings.**

   Percentage of benefit to be accrued by applicant:

   Percentage of benefit to be accrued by CALFED or others: **With completion of this project it will give us flexability with respect to our surface water supply in that it will give us additional locations within the surrounding basin to recharge the groundwater supply.**

10. Estimated annual amount of water to be saved (acre-feet): **400 acre ft**

    Estimated total amount of water to be saved (acre-feet): **4,000 acre ft**

    **Over a 10 year period, possibly more depending on rainfall and water tables within the basin.**

    Estimated benefits to be realized in terms of water quality,
    In-stream flow, other:

11. Duration of project: **12/2002 to 4/2003**

12. State Assembly District where the project is to be conducted: **32nd District**

13. State Senate District where the project is to be conducted: **14th District**

14. Congressional district(s) where the project is to be conducted: **21st District**

15. County where the project is to be conducted: **Tulare**

16. Date most recent Urban Water Management Plan submitted to the Department of Water Resources:

17. Type of applicant:

    Prop 13 Urban Grants and Prop 13 Agricultural Feasibility Study Grants:

    (a) city
    (b) county
    (c) city and county
    (d) joint power authority
    X **(e) other political subdivision of the State including public water district**
    (f) incorporated mutual water company

    DWR WUE Projects: the above Entities (a) through (f) or:

    (g) investor-owned utility
    (h) non-profit organization
    (i) tribe
    (j) university
    (k) state agency
    (l) federal agency

18. Project focus:

    X **(a) agricultural**
    (b) urban

19. Project type:
Prop 13 Urban Grants or Prop 13 Agricultural Feasibility Study Grant

(a) implementation of Urban Best Management Practices

capital outlay project related to :

**X (b) implementation of Agricultural Efficient Water management Practices**

(c) implementation of Quanitifable Objectives (include QO number(s))

(d) other (specify)

DWR WUE Project related to:

(e) implementation of Urban Best Management Practices

**X (f) implementation of Agricultural Efficient Water Management Practices**

(g) implementation of Quantifiable Objectives (include QO number(s))

(h) innovative projects (initial investigation ofnew technologies, methodologies, approaches, or institutional frameworks)

(i) research or pilot projects

(j) education or public information programs

(k) other (specify)

20. Do the actions in this proposal involve physical changes in land use, or potential future changes in land use?

(a) yes

**X (b) no**

If yes, the applicant must complete the CALFED PSP Land Use Checklist found at http://calfed.water.ca.gov/ environmental__docs.html and submit it with the proposal.

Task List and Schedule

This project will be completed within a 3 or 4 month time period. Reservoir construction, filter and booster stations installed during our off-season. This time frame allows us to be ready for the spring 2003 irrigation season.

Monitoring and Assessment

Our goals and objectives have always been the same. Increase our flexability, save Money on energy reduction and preserve and enhance our groundwater basin.

Success of the project will be determined by flow meter readings charted monthly on surface water and daily on wellhead meters. Also, we will rely on our annual pump tests and booster station test through Southern California Edison to chart our efficiency. There will also be some filtration studies and water analysis done with surface water vs. well water and a combination of both (blended). All of these records will be filed at the District office.

Consolidated Water Use Efficiency 2002 PSP
Proposal Part One:
B. **Signature Page**

By signing below, the officaial declares the following:

The truthfulness of all representations in the proposal;

The individual signing the form is authorized to submit the proposal on behalf of the applicant; and

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant.

| Steve Drumright | General Manager | 2-26-2002 |
|---|---|---|
| Signature | Name and Title | Date |

Vandalia Irrigation District
2032 S. Hillcrest
Porterville, CA 93257

February 26,  2002

Water Use Efficiency Office
California Dept.. of Water Resources
P.O. Box 942836
Sacramento, CA. 94236-0001

Attention: Marsha Prillwitz

Re:  Vandalia Irrigation District Reservoir Project Surface and Groundwater Utilization

Dear Reviewing Committee;

We are applying for the grant funding with regards to the Water Use Efficiency Program.

I would like to give you a brief history and characteristics of the district. Also our plans and goals for the future.

We are situated southeast of Porterville in the central San Joaquin Valley. The district was formed in 1923 and is a public agency. We are not a C.V.P. contractor. Our sole source of water is the Tule River watershed. We are entitled to a percentage of the contracted storage space behind Success Reservoir.

On the 21st of June 2000, the Irrigation Training and Research Center (ITRC) of California Polytechnic State University came to our facility for a site visit and to perform a rapid appraisal on the Vandalia Irrigation District. The purpose of the visit was to investigate the possibility of changing the operations of the district from a groundwater-only district to a conjunctive-use district. Currently, all of the water for the district operations is percolated into a series of reservoirs located within an old alignment of the Tule River. The water is diverted from the Tule River and travels about 5 miles (1/2 mile lined) through the Campbell-Moreland (CM) Ditch to the start of the district located northeast of the intersection of Avenue 140 and Road 260. Water is diverted into 2 percolation pond areas for 2 well fields, lifted and pipelined to Booster Station #1 using 17 deep well pumps, and then boosted within the district using 3 separate booster pump stations.

**Scope of Work**

**Recommendations**

Suggested changes to the district would be to add a reservoir at the start of the district near Booster Pump #1. This could be used to store surface water directly from the CM Ditch. A new booster pump station would need to be added to handle the different pumping requirements to lift from the reservoir.

1) New reservoir located near existing Booster Pump Station 1.
2) New booster pumps at booster station #1(4,000 gpm).
3) New filtration system at booster station #1(4,000 gpm).
4) VFD on one of the new booster pumps.
5) SCADA package for monitoring pressures in the system.

The advantages to the district of a modified operation include:

- Decreased energy costs/use - with the future uncertainty in the deregulated marketplace this might have a significant impact on future operations.

- Additional capacity for groundwater recharge - this would allow the district more flexibility to store water with the percolation pond areas for use in drought years. This has the added benefit of aiding USBR contractors located downslope of Vandalia ID. This is possible because Vandalia ID does not use its full entitlement of the surface water supply from Success Lake. It is estimated by Steve that this could be close to 2,000 acre-feet in a wet year.

- Increased capacity at peak flow requirement periods - it is anticipated the project will require the addition of a new booster pump station located parallel to Booster Station #1. This will allow for additional capacity to be put into the pipelines. The pipeline system has a capacity of 4,000 gpm. This is limiting during the peak water use period. There is additional capacity at Booster Pump Station #2. The additional capacity can do 2 things: i) provide additional capacity at peak requirements, and ii) provide capacity to add additional acreage to the district tax base.

- Improved ability to handle fluctuations in the CM Ditch. Instead of the inefficiency of varying flows being turned into the percolation ponds and then being re-lifted to the pipelines.

- Centralized filtration to improve filtering. Right now the water is partially filtered by the well system. However, wells will place a heavy load of sand into the system. Sand is very difficult to remove from the system.

- Increased flexibility. Changing the district's ability to improve the frequency, rate, and duration of the flows will improve the availability and reliability of the water supplies. These items will in turn provide the farmers with better service and with better service yield improvements are possible.

The disadvantages include:

- Expense of a reservoir, booster pump upgrade (or replacement), variable frequency drive (VFD), and filters.

- A surface water supply from a reservoir will require more filtration than is being done currently.

**Cost Estimate Spreadsheets**

In 2001, Vandalia Irrigation District spent about $173,000.00 (1,100,000 kwh) on electricity for the pumping of water for about 1200 acres of citrus trees.

The attached spreadsheets are set up to show what the annual savings could be if Vandalia ID decided to modify operations with a reservoir to deliver water. The annual cost per year and annual Kilowatt per hour columns are shown for each well and booster pump station for present and possible future conditions.

The first set of data is from Vandalia ID records and information collected by Southern California Edison. The data include the calculated hour per year operation of each well and booster pump, dollars spent per year, and Kilowatt-hours. Shown at the top of each table is a ratio of peak use time during an average week between On-Peak, Mid-Peak, and Off-Peak times. These numbers are used to reflect approximate operating conditions and were used mainly to recreate a calculation of the total cost of operating well and booster pumps. Also included in the electricity costs were the "Facilities related demand charges" and the "Time related demand charge."

The second set of data is related to the following assumptions:

- Wells would operate close to a free-flow operation discharge head.
- Wells would only operate 50% of the time (compared to current hours).
- Wells would only operate off-peak.
- Booster pump operation would be similar except, Booster Pump #1 will have a negative suction pressure (or close to zero psi) instead of 10 psi of positive inlet pressure.

On the sheet that displays well pump data, the On-Peak and the Mid-Peak charges were left zeroed out with the intent that the motors will not be in operation at those times. A portion amount of time is still allowed in the Off-Peak category since some wells may be needed at some point for back-up during the high demand times of year. The booster pump spreadsheets show the same information as the normal conditions pumping operation with the exception of the two 50 hp pumps at location #1. The TDH was increased due to the extra feet of head that must be boosted out of the reservoir.

**Results**

Refer to the attached spreadsheets. A saving of nearly $45,000 annually may be realized by modifying the operation of the district.

**Estimated Costs**

| | | |
|---|---|---|
| New booster pump station | $40,000 | (2-40 hp pumps and manifold) |
| New filter system | $50,000 | (20 sand media tanks) |
| Reservoir | $200,000 | (Construction only - 40 af storage on roughly 10 acres) |
| VFD | $30,000 | (on one of the pump) |
| SCADA package | $60,000 | (monitoring capability only) |
| Total | $380,000 | |

The simple payback would be about **<u>10 years</u>**. However, there is the added economic benefit of several other factors.

1) Pipeline capacity.
2) Increased flexibility.
3) Additional groundwater recharge.
4) Possibly, less sand in the system plugging and/or wearing out sprinklers

## Vandalia Irrigtion District

| Year | Month | Sales ($) | Usage (kWh) | | |
|---|---|---|---|---|---|
| 1996 | January | $1,038 | 8,155 | | |
| | February | $997 | 6,953 | | |
| | March | $1,119 | 8,913 | | |
| | April | $2,007 | 20,107 | | |
| | May | $6,221 | 86,530 | | |
| | June | $8,448 | 161,778 | | |
| | July | $14,935 | 175,811 | | |
| | August | $16,834 | 200,325 | | |
| | September | $15,654 | 197,023 | | |
| | October | $13,153 | 160,560 | | |
| | November | $4,950 | 68,574 | Total Usage: | 1,109,681 |
| | December | $1,401 | 14,952 | Total Cost: | $86,757 |
| 1997 | January | $1,062 | 9,366 | | |
| | February | $932 | 6,971 | | |
| | March | $1,190 | 10,952 | | |
| | April | $4,502 | 67,761 | | |
| | May | $7,439 | 110,554 | | |
| | June | $12,157 | 167,818 | | |
| | July | $15,076 | 173,858 | | |
| | August | $16,274 | 185,899 | | |
| | September | $15,289 | 169,043 | | |
| | October | $12,675 | 150,192 | | |
| | November | $5,686 | 81,351 | Total Usage: | 1,142,274 |
| | December | $1,037 | 8,509 | Total Cost: | $93,319 |
| 1998 | January | $1,013 | 8,168 | | |
| | February | $961 | 6,953 | | |
| | March | $543 | 140 | | |
| | April | $1,268 | 16,573 | | |
| | May | $1,347 | 13,379 | | |
| | June | $4,027 | 51,370 | | |
| | July | $12,216 | 133,393 | | |
| | August | $16,916 | 186,274 | | |
| | September | $15,264 | 165,748 | | |
| | October | $12,840 | 146,498 | | |
| | November | $5,451 | 78,878 | Total Usage: | 826,646 |
| | December | $1,641 | 19,272 | Total Cost: | $73,487 |
| 1999 | January | $4,352 | 56,087 | | |
| | February | $866 | 5,298 | | |
| | March | $1,154 | 9,705 | | |
| | April | $1,276 | 11,731 | | |
| | May | $7,479 | 110,504 | | |
| | June | $5,484 | 73,573 | | |
| | July | $15,556 | 173,153 | | |
| | August | $15,706 | 174,843 | | |
| | September | $16,554 | 192,395 | | |
| | October | $14,198 | 171,791 | | |
| | November | $7,637 | 111,742 | Total Usage: | 1,155,608 |
| | December | $5,106 | 64,786 | Total Cost: | $95,368 |

Vandalia Irrigation District Electric Monthly Summary 1996-2001

| Year | Month | Sales ($) | Usage (kWh) | | |
|---|---|---|---|---|---|
| 2000 | January | $4,644 | 58,800 | | |
| | February | $1,131 | 9,600 | | |
| | March | $1,985 | 5,200 | | |
| | April | $3,237 | 28,000 | | |
| | May | $6,717 | 65,200 | | |
| | June | $16,736 | 186,000 | | |
| | July | $13,837 | 151,200 | | |
| | August | $16,740 | 186,000 | | |
| | September | $17,007 | 197,200 | | |
| | October | $29,488 | 151,600 | | |
| | November | $17,438 | 66,000 | Total Usage: | 1,153,200 |
| | December | $4,356 | 48,400 | Total Cost: | $133,316 |
| 2001 | January | $2,923 | 36,800 | | |
| | February | $4,111 | 10,000 | | |
| | March | $2,176 | 6,800 | | |
| | April | $4,580 | 42,000 | | |
| | May | $5,700 | 67,200 | | |
| | June | $19,896 | 158,400 | | |
| | July | $21,033 | 181,600 | | |
| | August | $42,057 | 181,600 | | |
| | September | $43,525 | 190,800 | | |
| | October | $17,808 | 150,400 | | |
| | November | $8,741 | 92,000 | Total Usage: | 1,123,200 |
| | December | $984 | 5,600 | Total Cost: | $173,534 |

Booster Station #1

| | Manufacturer | Model | Serial # | HP | Flow Rate (GPM) | psi u/s P | psi d/s P | feet TDH | eff. | Input Horsepower Ihp | Kw |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | PACO Smart Pump | 11-80123-058200 | DD 89C0050401A | 25 | 2025 | | | | | | |
| | PACO Smart Pump | 11-80123-058200 | DD 89C0050401A | 25 | 2025 | | | | | | |
| Totals | | | | 50 | 4050 | 6.0-18 | 20-30 | 30.03 | 0.75 | **41.0** | 30.5 |

Booster Station #2

| | Manufacturer | Model | Serial # | HP | Flow Rate (GPM) | psi u/s P | psi d/s P | feet TDH | eff. | Input Horsepower Ihp | Kw |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Crane-Deming - Split Case | 10X8X12 | DC-508126 | 75 | 2430 | | | | | | |
| | Byron Jackson -Split Case | 8" Type - 5 | 129781 | 40 | 1530 | | | | | | |
| | Crane-Deming | 3" | DC743909 | 15 | 270 | | | | | | |
| | ? | 2.5" Inflow x 2" Discharge | 5K284D204 | 7.5 | 90 | | | | | | |
| Totals | | | | 137.5 | 4320 | 6.0-11 | 48 | 91.25 | 0.75 | **132.7** | 99.0 |

Booster Station #3

| | Manufacturer | Model | Serial # | HP | Flow Rate (GPM) | psi u/s P | psi d/s P | feet TDH | eff. | Input Horsepower Ihp | Kw |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Byron Jackson Iron. Wks. | 83551 (5", made in 1925) | ? | 50 | 630 | | | | | | |
| | Fairbanks Morse | 5823 | KTFJ105213 | 25 | 450 | | | | | | |
| | ? | size: 2" inflow x 1.5" discharge | NO 557041 | 7.5 | 90 | | | | | | |
| Totals | | | | 82.5 | 1170 | 3.0-10 | 73 | 153.62 | 0.75 | **60.5** | 45.1 |

| | 1<br>A | 2<br>B | 3<br>C | 4<br>#1 | 5<br>#5 | 6<br>#6 | 7<br>#7 | 8<br>#9 | 9<br>#12 | 10<br>#13 | 11<br>#18 | 12<br>#19 | 13<br>#20 | 14<br>#21 | 15<br>#22 | 16<br>#23 | 17<br>#24 | Total<br>Days | Total<br>Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| March | 0 | 0 | 0 | 5 | 0 | 6 | 2 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 18 | 432 |
| April | 0 | 0 | 0 | 6 | 0 | 8 | 4 | 1 | 0 | 4 | 4 | 6 | 2 | 0 | 0 | 0 | 0 | 35 | 840 |
| May | 0 | 0 | 0 | 26 | 20 | 23 | 9 | 8 | 1 | 10 | 17 | 19 | 9 | 0 | 0 | 0 | 9 | 151 | 3624 |
| June | 0 | 5 | 0 | 23 | 30 | 28 | 14 | 19 | 10 | 14 | 29 | 21 | 25 | 7 | 4 | 3 | 13 | 245 | 5880 |
| July | 5 | 10 | 4 | 22 | 31 | 31 | 20 | 19 | 14 | 24 | 30 | 30 | 30 | 21 | 6 | 9 | 21 | 327 | 7848 |
| August | 2 | 14 | 1 | 20 | 30 | 29 | 16 | 24 | 20 | 26 | 31 | 31 | 30 | 21 | 6 | 7 | 16 | 324 | 7776 |
| September | 1 | 9 | 2 | 22 | 30 | 30 | 22 | 21 | 16 | 24 | 29 | 30 | 29 | 18 | 6 | 8 | 20 | 317 | 7608 |
| October | 2 | 6 | 2 | 20 | 28 | 28 | 11 | 17 | 11 | 15 | 28 | 30 | 28 | 13 | 5 | 1 | 9 | 254 | 6096 |
| November | 1 | 4 | 0 | 3 | 16 | 14 | 2 | 6 | 7 | 12 | 14 | 14 | 13 | 6 | 2 | 0 | 2 | 116 | 2784 |
| December | 2 | 4 | 1 | 0 | 14 | 15 | 0 | 6 | 8 | 10 | 11 | 13 | 12 | 7 | 2 | 2 | 8 | 115 | 2760 |
| | | | | | | | | | | | | | | | | | | | |
| Total Days | 13 | 52 | 10 | 147 | 199 | 212 | 100 | 121 | 87 | 144 | 193 | 194 | 178 | 93 | 31 | 30 | 98 | 1902 | 45648 |
| Total Hours | 312 | 1248 | 240 | 3528 | 4776 | 5088 | 2400 | 2904 | 2088 | 3456 | 4632 | 4656 | 4272 | 2232 | 744 | 720 | 2352 | 45648 | |

1999 Booster Pump Useage in 24 Hour Days / Year

| | Days |
|---|---|
| Station #1 | |
| 25 HP Booster | 202 |
| 25 HP Booster | 97 |
| Station #2 | |
| 75 HP Booster | 123 |
| 40 HP Booster | 152 |
| 15 HP Booster | 61 |
| 7.5 HP Booster | 65 |
| Station #3 | |
| 50 HP Booster | 95 |
| 25 HP Booster | 145 |
| 7.5 HP Booster | 30 |
| Total: | 970 Days |
| | 23280 Hours / Year |

Vandalia Irrigation District

Energy Cost Analysis for Modified Conditions

Modified Operations

On_Peak: $0.17408 / kWh | Ratio of On-Peak Time During the Week: 0.00

| | Existing Wells | TDH (ft) | GPM Q | AF/ 24hrs | % plant eff. | '99 Use (Hours) | Total Use AF | Rate $ / kWh | kWh/AF | kW | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Well A | 161.3 | 150 | 0.633 | 0.340 | 0 | 0.00 | $0.17408 | 485.0 | 13.4 | $0 | 0 |
| | Well B | 108.5 | 269 | 1.189 | 0.387 | 0 | 0.00 | $0.17408 | 287.0 | 14.2 | $0 | 0 |
| * | Well C | 168.5 | 239 | 1.057 | 0.454 | 0 | 0.00 | $0.17408 | 417.3 | 16.7 | $0 | 0 |
| * | Well #1 | 44.3 | 394 | 1.742 | 0.493 | 0 | 0.00 | $0.17408 | 100.6 | 6.7 | $0 | 0 |
| | Well # 5 | 63.7 | 353 | 1.560 | 0.481 | 0 | 0.00 | $0.17408 | 135.0 | 8.8 | $0 | 0 |
| * | Well #6 | 65.7 | 235 | 1.041 | 0.321 | 0 | 0.00 | $0.17408 | 230.1 | 9.1 | $0 | 0 |
| * | Well #7 | 49.0 | 326 | 1.440 | 0.631 | 0 | 0.00 | $0.17408 | 87.4 | 4.8 | $0 | 0 |
| * | Well #9 | 73.0 | 384 | 1.698 | 0.367 | 0 | 0.00 | $0.17408 | 223.1 | 14.4 | $0 | 0 |
| | Well # 12 | 57.6 | 191 | 0.844 | 0.296 | 0 | 0.00 | $0.17408 | 199.0 | 7.0 | $0 | 0 |
| | Well # 13 | 23.0 | 386 | 1.706 | 0.188 | 0 | 0.00 | $0.17408 | 125.0 | 8.9 | $0 | 0 |
| | Well # 18 | 44.0 | 266 | 1.176 | 0.298 | 0 | 0.00 | $0.17408 | 151.0 | 7.4 | $0 | 0 |
| | Well # 19 | 23.3 | 462 | 2.838 | 0.492 | 0 | 0.00 | $0.17408 | 85.0 | 4.1 | $0 | 0 |
| | Well # 20 | 86.4 | 235 | 1.039 | 0.497 | 0 | 0.00 | $0.17408 | 178.0 | 7.7 | $0 | 0 |
| | Well # 21 | 76.3 | 244 | 1.078 | 0.226 | 0 | 0.00 | $0.17408 | 46.1 | 15.5 | $0 | 0 |
| * | Well #22 | 110.1 | 156 | 0.691 | 0.370 | 0 | 0.00 | $0.17408 | 334.6 | 8.7 | $0 | 0 |
| * | Well #23 | 180.1 | 594 | 2.627 | 0.550 | 0 | 0.00 | $0.17408 | 364.3 | 36.6 | $0 | 0 |
| * | Well #24 | 122.0 | 275 | 1.214 | 0.600 | 0 | 0.00 | $0.17408 | 231.7 | 10.5 | $0 | 0 |
| | | | | | | | | | | | $0 | 0 |

Mid-Peak: $0.09756 / kWh | Ratio of Mid-Peak Time During the Week: 0.00

| | Existing Wells | TDH (ft) | GPM Q | AF/ 24hrs | % plant eff. | '99 Use (Hours) | Total Use AF | Rate $ / kWh | kWh/AF | kW | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Well A | 161.3 | 150 | 0.633 | 0.340 | 0 | 0.00 | $0.097560 | 485.0 | 13.4 | $0 | 0 |
| | Well B | 108.5 | 269 | 1.189 | 0.387 | 0 | 0.00 | $0.097560 | 287.0 | 14.2 | $0 | 0 |
| * | Well C | 168.5 | 239 | 1.057 | 0.454 | 0 | 0.00 | $0.097560 | 417.3 | 16.7 | $0 | 0 |
| * | Well #1 | 44.3 | 394 | 1.742 | 0.493 | 0 | 0.00 | $0.097560 | 100.6 | 6.7 | $0 | 0 |
| | Well # 5 | 63.7 | 353 | 1.560 | 0.481 | 0 | 0.00 | $0.097560 | 135.0 | 8.8 | $0 | 0 |
| * | Well #6 | 65.7 | 235 | 1.041 | 0.321 | 0 | 0.00 | $0.097560 | 230.1 | 9.1 | $0 | 0 |
| * | Well #7 | 49.0 | 326 | 1.440 | 0.631 | 0 | 0.00 | $0.097560 | 87.4 | 4.8 | $0 | 0 |
| * | Well #9 | 73.0 | 384 | 1.698 | 0.367 | 0 | 0.00 | $0.097560 | 223.1 | 14.4 | $0 | 0 |
| | Well # 12 | 57.6 | 191 | 0.844 | 0.296 | 0 | 0.00 | $0.097560 | 199.0 | 7.0 | $0 | 0 |
| | Well # 13 | 23.0 | 386 | 1.706 | 0.188 | 0 | 0.00 | $0.097560 | 125.0 | 8.9 | $0 | 0 |
| | Well # 18 | 44.0 | 266 | 1.176 | 0.298 | 0 | 0.00 | $0.097560 | 151.0 | 7.4 | $0 | 0 |
| | Well # 19 | 23.3 | 462 | 2.838 | 0.492 | 0 | 0.00 | $0.097560 | 85.0 | 4.1 | $0 | 0 |
| | Well # 20 | 86.4 | 235 | 1.039 | 0.497 | 0 | 0.00 | $0.097560 | 178.0 | 7.7 | $0 | 0 |
| | Well # 21 | 76.3 | 244 | 1.078 | 0.226 | 0 | 0.00 | $0.097560 | 46.1 | 15.5 | $0 | 0 |
| * | Well #22 | 110.1 | 156 | 0.691 | 0.370 | 0 | 0.00 | $0.097560 | 334.6 | 8.7 | $0 | 0 |
| * | Well #23 | 180.1 | 594 | 2.627 | 0.550 | 0 | 0.00 | $0.097560 | 364.3 | 36.6 | $0 | 0 |
| * | Well #24 | 122.0 | 275 | 1.214 | 0.600 | 0 | 0.00 | $0.097560 | 231.7 | 10.5 | $0 | 0 |
| | | | | | | | | | | | $0 | 0 |

Off-Peak: $0.06452 / kWh | Ratio of Off-Peak Time During the Week: 0.50

| | Existing Wells | TDH (ft) | GPM Q | AF/ 24hrs | % plant eff. | '99 Use (Days) | Total Use AF | Rate $ / kWh | kWh/AF | kW | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Well A | 161.3 | 150 | 0.633 | 0.340 | 456 | 288.65 | $0.06452 | 485.0 | 13.4 | $394 | 6,113 |
| | Well B | 108.5 | 269 | 1.189 | 0.387 | 924 | 1098.64 | $0.06452 | 287.0 | 14.2 | $847 | 13,128 |
| * | Well C | 168.5 | 239 | 1.057 | 0.454 | 420 | 443.94 | $0.06452 | 417.3 | 16.7 | $453 | 7,018 |
| * | Well #1 | 44.3 | 394 | 1.742 | 0.493 | 2,064 | 3595.49 | $0.06452 | 100.6 | 6.7 | $888 | 13,767 |
| | Well # 5 | 63.7 | 353 | 1.560 | 0.481 | 2,688 | 4193.28 | $0.06452 | 135.0 | 8.8 | $1,527 | 23,672 |
| * | Well #6 | 65.7 | 235 | 1.041 | 0.321 | 2,844 | 2960.60 | $0.06452 | 230.1 | 9.1 | $1,664 | 25,787 |
| * | Well #7 | 49.0 | 326 | 1.440 | 0.631 | 1,500 | 2160.00 | $0.06452 | 87.4 | 4.8 | $461 | 7,152 |
| * | Well #9 | 73.0 | 384 | 1.698 | 0.367 | 1,752 | 2974.90 | $0.06452 | 223.1 | 14.4 | $1,626 | 25,205 |
| | Well # 12 | 57.6 | 191 | 0.844 | 0.296 | 1,344 | 1134.34 | $0.06452 | 199.0 | 7.0 | $607 | 9,410 |
| | Well # 13 | 23.0 | 386 | 1.706 | 0.188 | 2,028 | 3459.77 | $0.06452 | 125.0 | 8.9 | $1,164 | 18,041 |
| | Well # 18 | 44.0 | 266 | 1.176 | 0.298 | 2,616 | 3076.42 | $0.06452 | 151.0 | 7.4 | $1,249 | 19,355 |
| | Well # 19 | 23.3 | 462 | 2.838 | 0.492 | 2,628 | 7458.26 | $0.06452 | 85.0 | 4.1 | $699 | 10,832 |
| | Well # 20 | 86.4 | 235 | 1.039 | 0.497 | 2,436 | 2531.00 | $0.06452 | 178.0 | 7.7 | $1,210 | 18,748 |
| | Well # 21 | 76.3 | 244 | 1.078 | 0.226 | 1,416 | 1526.45 | $0.06452 | 46.1 | 15.5 | $1,418 | 21,974 |
| * | Well #22 | 110.1 | 156 | 0.691 | 0.370 | 672 | 464.35 | $0.06452 | 334.6 | 8.7 | $379 | 5,878 |
| * | Well #23 | 180.1 | 594 | 2.627 | 0.550 | 660 | 1733.82 | $0.06452 | 364.3 | 36.6 | $1,560 | 24,178 |
| * | Well #24 | 122.0 | 275 | 1.214 | 0.600 | 1,476 | 1791.86 | $0.06452 | 231.7 | 10.5 | $1,003 | 15,549 |
| | | | | | | | | | | | $14,208 | 220,203 |

*These well numbers have been generated using data from normal operating wells. They have been calculated using the following ratios:
TDH - decreased 22% of normal operation
Q - increased 29% of normal operation
AF / 24 hrs - increased 22% of normal operation
plant eff. - remained the same as normal operation
kWh/AF - increased 33% of normal operation

| | |
|---|---|
| Well Pumping Cost: | **$14,208** |
| Well Pumping kWh: | 220,203 |

| On Peak | $0.17408 / kWh |
|---|---|

| Ratio of On-Peak Time During the Week: | 0.30 |
|---|---|

| Booster Pump | Input HP | psi u/s | psi d/s | TDH (ft) | Flow (GPM) | % pump eff. | annual hours | Rate $ / kWh | Kilowatts | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1-A | 44.4 | -1.0 | 25.0 | 60.06 | 2050 | 0.70 | 1,454 | $0.17408 | 33.13 | $8,389 | 48,191 |
| #1-B | 44.4 | -1.0 | 25.0 | 60.06 | 2050 | 0.70 | 698 | $0.17408 | 33.13 | $4,028 | 23,141 |
| #2-A | 80.0 | 8.5 | 48.0 | 91.25 | 2430 | 0.70 | 886 | $0.17408 | 59.67 | $9,199 | 52,844 |
| #2-B | 50.4 | 8.5 | 48.0 | 91.25 | 1530 | 0.70 | 1,094 | $0.17408 | 37.57 | $7,158 | 41,117 |
| #2-C | 8.9 | 8.5 | 48.0 | 91.25 | 270 | 0.70 | 439 | $0.17408 | 6.63 | $507 | 2,912 |
| #2-D | 3.0 | 8.5 | 48.0 | 91.25 | 90 | 0.70 | 468 | $0.17408 | 2.21 | $180 | 1,034 |
| #3-A | 34.9 | 6.5 | 73.0 | 153.62 | 630 | 0.70 | 684 | $0.17408 | 26.04 | $3,101 | 17,815 |
| #3-B | 24.9 | 6.5 | 73.0 | 153.62 | 450 | 0.70 | 1,044 | $0.17408 | 18.60 | $3,381 | 19,422 |
| #3-C | 5.0 | 6.5 | 73.0 | 153.62 | 90 | 0.70 | 216 | $0.17408 | 3.72 | $140 | 804 |
| | | | | | | | | | | $36,083 | 207,280 |

| Mid-Peak | $0.09756 / kWh |
|---|---|

| Ratio of Mid-Peak Time During the Week: | 0.30 |
|---|---|

| Booster Pump | Input HP | psi u/s | psi d/s | TDH (ft) | Flow (GPM) | % pump eff. | annual hours | Rate $ / kWh | Kilowatts | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1-A | 44.4 | -1.0 | 25.0 | 60.06 | 2050 | 0.70 | 1,454 | $0.097560 | 33.13 | $4,702 | 48,191 |
| #1-B | 44.4 | -1.0 | 25.0 | 60.06 | 2050 | 0.70 | 698 | $0.097560 | 33.13 | $2,258 | 23,141 |
| #2-A | 80.0 | 8.5 | 48.0 | 91.25 | 2430 | 0.70 | 886 | $0.097560 | 59.67 | $5,155 | 52,844 |
| #2-B | 50.4 | 8.5 | 48.0 | 91.25 | 1530 | 0.70 | 1,094 | $0.097560 | 37.57 | $4,011 | 41,117 |
| #2-C | 8.9 | 8.5 | 48.0 | 91.25 | 270 | 0.70 | 439 | $0.097560 | 6.63 | $284 | 2,912 |
| #2-D | 3.0 | 8.5 | 48.0 | 91.25 | 90 | 0.70 | 468 | $0.097560 | 2.21 | $101 | 1,034 |
| #3-A | 34.9 | 6.5 | 73.0 | 153.62 | 630 | 0.70 | 684 | $0.097560 | 26.04 | $1,738 | 17,815 |
| #3-B | 24.9 | 6.5 | 73.0 | 153.62 | 450 | 0.70 | 1,044 | $0.097560 | 18.60 | $1,895 | 19,422 |
| #3-C | 5.0 | 6.5 | 73.0 | 153.62 | 90 | 0.70 | 216 | $0.097560 | 3.72 | $78 | 804 |
| | | | | | | | | | | $20,222 | 207,280 |

| Off-Peak | $0.06452 / kWh |
|---|---|

| Ratio of Off-Peak Time During the Week: | 0.40 |
|---|---|

| Booster Pump | Input HP | psi u/s | psi d/s | TDH (ft) | GPM Q | % pump eff. | annual hours | Rate $ / kWh | Kilowatts | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|
| #1-A | 44.4 | -1.0 | 25.0 | 60.06 | 2050 | 0.70 | 1,939 | $0.06452 | 33.13 | $4,146 | 64,255 |
| #1-B | 44.4 | -1.0 | 25.0 | 60.06 | 2050 | 0.70 | 931 | $0.06452 | 33.13 | $1,991 | 30,855 |
| #2-A | 80.0 | 8.5 | 48.0 | 91.25 | 2430 | 0.70 | 1,181 | $0.06452 | 59.67 | $4,546 | 70,459 |
| #2-B | 50.4 | 8.5 | 48.0 | 91.25 | 1530 | 0.70 | 1,459 | $0.06452 | 37.57 | $3,537 | 54,823 |
| #2-C | 8.9 | 8.5 | 48.0 | 91.25 | 270 | 0.70 | 586 | $0.06452 | 6.63 | $251 | 3,883 |
| #2-D | 3.0 | 8.5 | 48.0 | 91.25 | 90 | 0.70 | 624 | $0.06452 | 2.21 | $89 | 1,379 |
| #3-A | 34.9 | 6.5 | 73.0 | 153.62 | 630 | 0.70 | 912 | $0.06452 | 26.04 | $1,533 | 23,753 |
| #3-B | 24.9 | 6.5 | 73.0 | 153.62 | 450 | 0.70 | 1,392 | $0.06452 | 18.60 | $1,671 | 25,896 |
| #3-C | 5.0 | 6.5 | 73.0 | 153.62 | 90 | 0.70 | 288 | $0.06452 | 3.72 | $69 | 1,072 |
| | | | | | | | | | | $17,832 | 276,374 |
| Booster Pump Totals: | | | | | | | | | | $74,137 | 690,935 |

Sample Calculation: xxx hrs / 1 year * $ / KW-Hr *Kw

**Annual Booster Pump Total: $74,137**

| VID Total Connected Load | HP |
|---|---|
| Lower Well Field | 110 |
| Upper Well Field | 100 |
| Well #23 | 50 |
| 3-Booster Stations | 270 |
| Total | 530 |

**Facilities Related Demand Charge**

$2.85 / kW
450 kW /month
12 months / year
$15,390 annually

calc: ($2.85 / kW) * (450 kW / month) * (12 months / year)

Total kWh, booster pumps & wells: 911,138

**Total Well Pumping & Booster Pump Costs:**

| | |
|---|---|
| Well Pumps: | $14,208 |
| Booster Pumps: | $74,137 |
| Demand Charges: | $15,390 |
| Taxes and Surcharges: | $22,778 |

**Well & Booster Pump Total: $126,513**

| On Peak | $0.17408 / kWh | | Ratio of On-Peak Time During the Week: | 0.30 |
|---|---|---|---|---|

| | Existing Wells | GPM Q | TDH (ft) | AF/ 24(hrs) | Plant Eff. | Rate $/Kw-Hr | Hours per year | kWh/Ac.Ft | af | kW | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Well A | 99 | 205.5 | 0.438 | 0.278 | $0.17408 | 274 | 757 | 5.0 | 13.8 | 658 | 3,772 |
| 2 | Well B | 235 | 155.4 | 1.039 | 0.452 | $0.17408 | 554 | 351 | 24.0 | 15.2 | 1,467 | 8,438 |
| 3 | Well C | 196 | 237.3 | 0.866 | 0.454 | $0.17408 | 252 | 535 | 9.1 | 19.3 | 847 | 4,863 |
| 4 | Well # 1 | 323 | 62.4 | 1.428 | 0.493 | $0.17408 | 1,238 | 129 | 73.7 | 7.7 | 1,655 | 9,538 |
| 5 | Well # 5 | 203 | 87.5 | 0.897 | 0.423 | $0.17408 | 1,613 | 211 | 60.3 | 7.9 | 2,214 | 12,758 |
| 6 | Well # 6 | 193 | 92.6 | 0.853 | 0.321 | $0.17408 | 1,706 | 295 | 60.6 | 10.5 | 3,115 | 17,897 |
| 7 | Well # 7 | 267 | 69.0 | 1.180 | 0.631 | $0.17408 | 900 | 112 | 44.3 | 5.5 | 863 | 4,950 |
| 8 | Well # 9 | 315 | 102.8 | 1.392 | 0.367 | $0.17408 | 1,051 | 286 | 61.0 | 16.6 | 3,035 | 17,473 |
| 9 | Well # 12 | 173 | 96.3 | 0.765 | 0.430 | $0.17408 | 806 | 229 | 25.7 | 7.3 | 1,025 | 5,886 |
| 10 | Well # 13 | 324 | 55.1 | 1.432 | 0.361 | $0.17408 | 1,217 | 156 | 72.6 | 9.3 | 1,972 | 11,336 |
| 11 | Well # 18 | 202 | 79.2 | 0.893 | 0.437 | $0.17408 | 1,570 | 186 | 58.4 | 6.9 | 1,891 | 10,825 |
| 12 | Well # 19 | 427 | 79.8 | 1.877 | 0.635 | $0.17408 | 1,577 | 128 | 123.3 | 10.1 | 2,748 | 15,940 |
| 13 | Well # 20 | 202 | 115.2 | 0.893 | 0.617 | $0.17408 | 1,462 | 191 | 54.4 | 7.1 | 1,808 | 10,385 |
| 14 | Well # 21 | 196 | 94.0 | 0.866 | 0.469 | $0.17408 | 850 | 47 | 30.7 | 7.4 | 250 | 6,287 |
| 15 | Well # 22 | 128 | 155.1 | 0.566 | 0.370 | $0.17408 | 403 | 429 | 9.5 | 10.1 | 710 | 4,076 |
| 16 | Well # 23 | 487 | 253.6 | 2.153 | 0.550 | $0.17408 | 396 | 467 | 35.5 | 42.3 | 2,888 | 16,752 |
| 17 | Well # 24 | 225 | 174.3 | 0.995 | 0.600 | $0.17408 | 886 | 297 | 36.7 | 12.3 | 1,898 | 10,905 |
| | Totals | | | | | | | | | | $29,043 | 172,080 |

| Mid-Peak | $0.09756 /kWh | | Ratio of Mid-Peak Time During the Week: | 0.30 |
|---|---|---|---|---|

| Existing Wells | GPM Q | TDH (ft) | AF/ 24(hrs) | Plant Eff. | Rate $/Kw-Hr | Hours per year | kWh/Ac.Ft | af | kW | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Well A | 99 | 205.5 | 0.438 | 0.278 | 0.07256 | 274 | 757 | 5.0 | 13.8 | 274 | 3,772 |
| Well B | 235 | 155.4 | 1.039 | 0.452 | 0.07256 | 554 | 351 | 24.0 | 15.2 | 611 | 8,438 |
| Well C | 196 | 237.3 | 0.866 | 0.454 | 0.07256 | 252 | 535 | 9.1 | 19.3 | 353 | 4,863 |
| Well # 1 | 323 | 62.4 | 1.428 | 0.493 | 0.07256 | 1,238 | 129 | 73.7 | 7.7 | 690 | 9,538 |
| Well # 5 | 203 | 87.5 | 0.897 | 0.423 | 0.07256 | 1,613 | 211 | 60.3 | 7.9 | 923 | 12,758 |
| Well # 6 | 193 | 92.6 | 0.853 | 0.321 | 0.07256 | 1,706 | 295 | 60.6 | 10.5 | 1,298 | 17,897 |
| Well # 7 | 267 | 69.0 | 1.180 | 0.631 | 0.07256 | 900 | 112 | 44.3 | 5.5 | 360 | 4,950 |
| Well # 9 | 315 | 102.8 | 1.392 | 0.367 | 0.07256 | 1,051 | 286 | 61.0 | 16.6 | 1,265 | 17,473 |
| Well # 12 | 173 | 96.3 | 0.765 | 0.430 | 0.07256 | 806 | 229 | 25.7 | 7.3 | 427 | 5,886 |
| Well # 13 | 324 | 55.1 | 1.432 | 0.361 | 0.07256 | 1,217 | 156 | 72.6 | 9.3 | 822 | 11,336 |
| Well # 18 | 202 | 79.2 | 0.893 | 0.437 | 0.07256 | 1,570 | 186 | 58.4 | 6.9 | 788 | 10,825 |
| Well # 19 | 427 | 79.8 | 1.877 | 0.635 | 0.07256 | 1,577 | 128 | 123.3 | 10.1 | 1,145 | 15,940 |
| Well # 20 | 202 | 115.2 | 0.893 | 0.617 | 0.07256 | 1,462 | 191 | 54.4 | 7.1 | 754 | 10,385 |
| Well # 21 | 196 | 94.0 | 0.866 | 0.469 | 0.07256 | 850 | 47 | 30.7 | 7.4 | 104 | 6,287 |
| Well # 22 | 128 | 155.1 | 0.566 | 0.370 | 0.07256 | 403 | 429 | 9.5 | 10.1 | 296 | 4,076 |
| Well # 23 | 487 | 253.6 | 2.153 | 0.550 | 0.07256 | 396 | 467 | 35.5 | 42.3 | 1,204 | 16,752 |
| Well # 24 | 225 | 174.3 | 0.995 | 0.600 | 0.07256 | 886 | 297 | 36.7 | 12.3 | 791 | 10,905 |
| Totals | | | | | | | | | | $12,106 | 172,080 |

| Off-Peak | $0.06452 /kWh | | Ratio of Off-Peak Time During the Week: | 0.40 |
|---|---|---|---|---|

| Existing Wells | GPM Q | TDH (ft) | AF/ 24(hrs) | Plant Eff. | Rate $/Kw-Hr | Hours per year | kWh/Ac.Ft | af | kW | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Well A | 99 | 205.5 | 0.438 | 0.278 | 0.03952 | 365 | 757 | 6.7 | 13.8 | 199 | 5,029.22 |
| Well B | 235 | 155.4 | 1.039 | 0.452 | 0.03952 | 739 | 351 | 32.0 | 15.2 | 444 | 11,251 |
| Well C | 196 | 237.3 | 0.866 | 0.454 | 0.03952 | 336 | 535 | 12.1 | 19.3 | 256 | 6,485 |
| Well # 1 | 323 | 62.4 | 1.428 | 0.493 | 0.03952 | 1,651 | 129 | 98.2 | 7.7 | 501 | 12,717 |
| Well # 5 | 203 | 87.5 | 0.897 | 0.423 | 0.03952 | 2,150 | 211 | 80.4 | 7.9 | 670 | 17,011 |
| Well # 6 | 193 | 92.6 | 0.853 | 0.321 | 0.03952 | 2,275 | 295 | 80.9 | 10.5 | 943 | 23,863 |
| Well # 7 | 267 | 69.0 | 1.180 | 0.631 | 0.03952 | 1,200 | 112 | 59.0 | 5.5 | 261 | 6,600 |
| Well # 9 | 315 | 102.8 | 1.392 | 0.367 | 0.03952 | 1,402 | 286 | 81.3 | 16.6 | 919 | 23,297 |
| Well # 12 | 173 | 96.3 | 0.765 | 0.430 | 0.03952 | 1,075 | 229 | 34.3 | 7.3 | 310 | 7,848 |
| Well # 13 | 324 | 55.1 | 1.432 | 0.361 | 0.03952 | 1,622 | 156 | 96.8 | 9.3 | 597 | 15,114 |
| Well # 18 | 202 | 79.2 | 0.893 | 0.437 | 0.03952 | 2,093 | 186 | 77.9 | 6.9 | 572 | 14,433 |
| Well # 19 | 427 | 79.8 | 1.877 | 0.635 | 0.03952 | 2,102 | 128 | 164.4 | 10.1 | 832 | 21,253 |
| Well # 20 | 202 | 115.2 | 0.893 | 0.617 | 0.03952 | 1,949 | 191 | 72.5 | 7.1 | 547 | 13,846 |
| Well # 21 | 196 | 94.0 | 0.866 | 0.469 | 0.03952 | 1,133 | 47 | 40.9 | 7.4 | 76 | 8,383 |
| Well # 22 | 128 | 155.1 | 0.566 | 0.370 | 0.03952 | 538 | 429 | 12.7 | 10.1 | 215 | 5,434 |
| Well # 23 | 487 | 253.6 | 2.153 | 0.550 | 0.03952 | 528 | 467 | 47.4 | 42.3 | 874 | 22,335 |
| Well # 24 | 225 | 174.3 | 0.995 | 0.600 | 0.03952 | 1,181 | 297 | 49.0 | 12.3 | 575 | 14,539 |
| Totals | | | | | | | | | | $8,791 | 229,439 |

Sample calculation: xx hrs/1year* AF/24 hrs/24*Kw-hr/AF*$/KW-Hr

| | |
|---|---|
| Total annual well pumping costs: | $49,940 |
| Total annual well pumping kWh: | 573,598 |

On Peak 0.17408 / kWh

Ratio of On-Peak Time During the Week: 0.30

| Booster Pump | Input HP | TDH (ft) | Flow (GPM) | % pump eff. | annual hours | Rate $/Kw-Hr | Kilowatts | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|
| #1-A | 22.2 | 30.03 | 2050 | 0.70 | 1,454 | 0.17408 | 16.57 | $4,195 | 24,096 |
| #1-B | 22.2 | 30.03 | 2050 | 0.70 | 698 | 0.17408 | 16.57 | $2,014 | 11,571 |
| #2-A | 80.0 | 91.25 | 2430 | 0.70 | 886 | 0.17408 | 59.67 | $9,200 | 52,847 |
| #2-B | 50.4 | 91.25 | 1530 | 0.70 | 1,094 | 0.17408 | 37.57 | $7,158 | 41,119 |
| #2-C | 8.9 | 91.25 | 270 | 0.70 | 439 | 0.17408 | 6.63 | $507 | 2,912 |
| #2-D | 3.0 | 91.25 | 90 | 0.70 | 468 | 0.17408 | 2.21 | $180 | 1,034 |
| #3-A | 34.9 | 153.62 | 630 | 0.70 | 684 | 0.17408 | 26.05 | $3,101 | 17,815 |
| #3-B | 24.9 | 153.62 | 450 | 0.70 | 1,044 | 0.17408 | 18.60 | $3,381 | 19,423 |
| #3-C | 5.0 | 153.62 | 90 | 0.70 | 216 | 0.17408 | 3.72 | $140 | 804 |
| | | | | | | | | $29,876 | 171,621 |

Mid-Peak $0.097560 / kWh

Ratio of Mid-Peak Time During the Week: 0.30

| Booster Pump | Input HP | TDH (ft) | Flow (GPM) | % pump eff. | annual hours | Rate $/Kw-Hr | Kilowatts | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|
| #1-A | 22.2 | 30.03 | 2050 | 0.70 | 1,454 | $0.097560 | 16.57 | $2,351 | 24,096 |
| #1-B | 22.2 | 30.03 | 2050 | 0.70 | 698 | $0.097560 | 16.57 | $1,129 | 11,571 |
| #2-A | 80.0 | 91.25 | 2430 | 0.70 | 886 | $0.097560 | 59.67 | $5,156 | 52,847 |
| #2-B | 50.4 | 91.25 | 1530 | 0.70 | 1,094 | $0.097560 | 37.57 | $4,012 | 41,119 |
| #2-C | 8.9 | 91.25 | 270 | 0.70 | 439 | $0.097560 | 6.63 | $284 | 2,912 |
| #2-D | 3.0 | 91.25 | 90 | 0.70 | 468 | $0.097560 | 2.21 | $101 | 1,034 |
| #3-A | 34.9 | 153.62 | 630 | 0.70 | 684 | $0.097560 | 26.05 | $1,738 | 17,815 |
| #3-B | 24.9 | 153.62 | 450 | 0.70 | 1,044 | $0.097560 | 18.60 | $1,895 | 19,423 |
| #3-C | 5.0 | 153.62 | 90 | 0.70 | 216 | $0.097560 | 3.72 | $78 | 804 |
| | | | | | | | | $16,743 | 171,621 |

Off-Peak $0.06452 / kWh

Ratio of Off-Peak Time During the Week: 0.40

| Booster Pump | Input HP | TDH (ft) | Flow (GPM) | % pump eff. | annual hours | Rate $/Kw-Hr | Kilowatts | $$/yr | kWh |
|---|---|---|---|---|---|---|---|---|---|
| #1-A | 22.2 | 30.03 | 2050 | 0.70 | 1,939 | $0.06452 | 16.57 | $2,073 | 32,128 |
| #1-B | 22.2 | 30.03 | 2050 | 0.70 | 931 | $0.06452 | 16.57 | $995 | 15,428 |
| #2-A | 80.0 | 91.25 | 2430 | 0.70 | 1,181 | $0.06452 | 59.67 | $4,546 | 70,463 |
| #2-B | 50.4 | 91.25 | 1530 | 0.70 | 1,459 | $0.06452 | 37.57 | $3,537 | 54,826 |
| #2-C | 8.9 | 91.25 | 270 | 0.70 | 586 | $0.06452 | 6.63 | $251 | 3,883 |
| #2-D | 3.0 | 91.25 | 90 | 0.70 | 624 | $0.06452 | 2.21 | $89 | 1,379 |
| #3-A | 34.9 | 153.62 | 630 | 0.70 | 912 | $0.06452 | 26.05 | $1,533 | 23,754 |
| #3-B | 24.9 | 153.62 | 450 | 0.70 | 1,392 | $0.06452 | 18.60 | $1,671 | 25,897 |
| #3-C | 5.0 | 153.62 | 90 | 0.70 | 288 | $0.06452 | 3.72 | $69 | 1,072 |
| | | | | | | | | $14,764 | 228,828 |

Booster Pump Totals: $61,383 572,069

Sample Calculation: xxx hrs / 1 year * $ / Kw-Hr *Kw

Total Annual Booster Pump Cost : **$61,383**

| VID Total Connected Load | HP |
|---|---|
| Lower Well Field | 110 |
| Upper Well Field | 100 |
| Well #23 | 50 |
| 3-Booster Stations | 270 |
| Total | 530 |

Facilities Related Demand Charge

$2.85 / kW
450 kW /month
12 months / year
$15,390.00 annually

Time Related Demand Charge

$9.00 / kW
450 kW / month
4 months per year, only used with On-Peak Charges
$16,200.00 annually

Total Well Pumping & Booster Pump Costs:

| | |
|---|---|
| Well Pumps: | **$49,940** |
| Booster Pumps: | **$61,383** |
| Demand Charges: | **$31,590** |
| Taxes and Surcharge: | **$28,642** |

Total Cost, Booster Pumps & Well Pumps: **$171,554**

Total kWh, Booster Pumps & Well Pumps: **1,145,668**

STATE OF CALIFORNIA - HEALTH AND WELFARE AGENCY

Gray Davis, Governor

DEPARTMENT OF DEVELOPMENTAL SERVICES
PORTERVILLE DEVELOPMENTAL CENTER
PLANT OPERATIONS
P.O. BOX 2000
Porterville, CA 93258
(559)782-2674

March 27, 2002

Board of Directors
Vandalia Irrigation District
2032 So. Hillcrest,
Porterville, CA 93257

Dear Board,

Porterville Developmental Center has been partnered with the Vandalia Irrigation District for well over fifty years. We share a common goal of ensuring water quality and quantity to our combined consumers, and with overall water operations. One should note that 100% of the potable water at this facility is pumped via our wells. Water from the Campbell-Moreland ditch is used exclusively to recharge our aquifers via PDC percolation ponds on grounds. Recharge and extraction of water then is of significant importance to our staff and consumers.

My understanding is that the Vandalia Irrigation District proposes to construct a 40 acre foot, concrete lined reservoir for surface water storage complete with a pumping plant and filtration system. This will increase the Districts flexibility while at the same time conserving electrical energy.

We support any effort to reduce energy consumption while increasing the flexibility of water operations. To our knowledge, this project has no ill effect or adverse impact to the water storage scenario of the basin. It is my recommendation this project be approved.

Sincerely,

James A. Fairbarn
Chief of Plant Operations II
Porterville Developmental Center

Tea Pot Dome District
105 West Tea Pot Dome Avenue
Porterville, CA 93257

Robert L. Koop
District Manager

February 26, 2002

Board of Directors
Vandalia Irrigation District
2032 S. Hillcrest
Porterville, CA 93257

Re: Vandalia Irrigation District
Irrigation Water Use Efficiency Project

Dear Board:

The Tea Pot Dome Water District Board of Directors has unanimously endorsed the Vandalia Irrigation District Irrigation Water Use Efficiency Project.

Currently, we are partners with VID with a Groundwater Management Plan, consisting of groundwater measurements of 25 local wells biannually. Also, including the development of a groundwater recharge and wildlife enhancement basin in 1996, approx. ½ mile east of their proposed project, which has been a success.

It is our understanding that Vandalia Irrigation District proposes the construction of a 40 a.f. concrete lined reservoir for surface storage of irrigation water along with the installation of a pumping plant and filtration system for the delivery of such stored irrigation water to Vandalia's existing distribution system for a reduction in the use of electrical energy.

The Tea Pot Dome Water District supports a project that would reduce the use of electrical energy without adversely affecting water storage within the basin.

Sincerely yours,

Robert L. Koop

Robert L. Koop, District Manager

Vandalia Irrigation District
Budget Summary

| Item | Amt | Units | Qty | Total Cost | Units | Life Yrs | Present Value | Local Share | CALFED Request |
|---|---|---|---|---|---|---|---|---|---|
| A. Salaries and Wages: | | | | | | | | | |
| Project Manager | 2083 | $/MO | 12 | 25,000 | $ | 1 | 25,000 | 25,000 | 0 |
| B. None | | | | | | | | | |
| C. Supplies: | | | | | | | | | |
| Booster | 40,000 | $ | 1 | 40,000 | 1 | 20 | 40,000 | 0 | 40,000 |
| Filter | 1,500 | $ | 20 | 30,000 | 20 | 20 | 50,000 | 0 | 50,000 |
| VFD Booster | 30,000 | $ | 1 | 30,000 | 1 | 20 | 30,000 | 0 | 30,000 |
| SCADA | 60,000 | $ | 1 | 60,000 | 1 | 20 | 60,000 | 0 | 60,000 |
| D. Equipment: | | | | | | | | | |
| Contractor Supply | 100,000 | $ | 1 | 100,000 | 1 | 25 | 200,000 | 0 | 200,000 |
| E. Services and Consultants: | | | | | | | | | |
| Engineer | 31,200 | $ | 1 | 31,200 | 1 | 1 | 41,200 | 41,200 | 0 |
| SCADA Design | 7,200 | $ | 1 | 7,200 | 1 | 1 | 7,200 | 7,200 | 0 |
| Filtration | 3,600 | $ | 1 | 3,600 | 1 | 1 | 3,600 | 3,600 | 0 |
| Electrical Consultant | 10,000 | $ | 1 | 10,000 | 1 | 1 | 10,000 | 10,000 | 0 |
| F. Travel | | | | | | | | | |
| | 833 | $/MO | 12 | 10,000 | $ | 1 | 10,000 | 10,000 | 0 |
| G. None | | | | | | | | | |
| H. Total Estimated Costs: | | | | | | | 477,000 | 97,000 | 380,000 |